CLAIMS

1. A device for reducing the phase noise of a signal (S_{in}) coming from a quasiperiodic source of fundamental frequency f_0, characterized in that it comprises a physical system for transmitting pulses by transferring particles, said physical system being defined so as to have a characteristic frequency f_c defining an operating frequency range of the device with a low limit that is dependent on said characteristic frequency, in such a way that, for the quasiperiodic signal (S_{in}) applied as input, said particles have a mutual repulsive interaction and said system delivering, as output, pulses at the fundamental frequency f_0.

2. The device for reducing the phase noise of a signal (S_{in}), coming from a quasiperiodic source of fundamental frequency f_0 as claimed in claim 1, characterized in that it comprises a superconducting circuit with an active line for voltage pulse transmission by transferring quanta of flux ϕ_0, said circuit being defined so as to have a characteristic frequency f_c such that $0.3f_c$ is less than or equal to the fundamental frequency f_0 of the quasiperiodic signal (S_{in}) applied as input, and delivering, as output, a voltage pulse signal of fundamental frequency f_0.

3. The phase noise reduction device as claimed in claim 1 or 2, comprising at least two superconducting circuits, namely a circuit for a π phase shift of the input or of the output of one of said circuits and a combiner circuit for producing a frequency-doubling stage in a frequency multiplication circuit.

4. The phase noise reduction device as claimed in claim 2 or 3, characterized in that the superconducting circuit comprises a Josephson transmission line

geometrically defined with said characteristic frequency.

5. The phase noise reduction device as claimed in claim 4, characterized in that the Josephson transmission line is a long Josephson junction.

6. The phase noise reduction device as claimed in claim 4, characterized in that said transmission line comprises a plurality of parallel-shunted Josephson junctions.

7. The phase noise reduction device as claimed in claim 6, characterized in that each Josephson transmission line is of the type comprising a line with bicrystal junctions.

8. The phase noise reduction device as claimed in claim 6, characterized in that each Josephson transmission line is of the type comprising a line with ramp-edge junctions.

9. The phase noise reduction device as claimed in any one of claims 5 to 8, characterized in that the superconducting circuit comprises several Josephson transmission lines placed in parallel.

10. The phase noise reduction device as claimed in claim 9, characterized in that it comprises a π phase shift circuit at the input of at least one transmission line, applying a phase-shifted signal to said line.

11. The phase noise reduction device as claimed in claim 10, characterized in that said phase shift circuit receives as input the input signal (S_{in}) of the device.

12. The phase noise reduction device as claimed in claim 10, characterized in that said phase shift

circuit receives as input the output signal from a line.

13. The phase noise reduction device as claimed in claim 11, characterized in that the superconducting circuit comprises n Josephson transmission lines of rank 1 to n in one and the same surface plane of a substrate, with n an integer ≥ 2, and in that one signal among the input signal and the phase-shifted input signal is applied to the lines of even rank and the other signal is applied to the lines of odd rank, the output signal being delivered as output of one of the n lines.

14. The phase noise reduction device as claimed in any one of the preceding claims 5 to 13, characterized in that it comprises current bias means comprising a plurality of branches for feeding the current, in order to distribute this current along each Josephson transmission line.

15. The phase noise reduction device as claimed in the preceding claim, characterized in that it comprises means for adjusting the intensity of the bias current according to the frequency of the input signal.

16. The phase noise reduction device as claimed in any one of claims 2 to 4, characterized in that the superconducting circuit comprises a vortex flux-flow voltage-pulse transmission line.

17. The phase noise reduction device as claimed in claim 16, characterized in that said transmission line comprises a superconducting film of type II in the hybrid state, deposited on a crystalline substrate, said film being current-biased at its ends and comprising a slot in the width direction, except at the point of a microbridge, said slot separating the film into two parts, and characterized in that the

quasiperiodic signal is applied to one end of the slot, between the two parts of the film, and the output signal is obtained at the other end of the slot, between the two parts of the film.

18. The phase noise reduction device as claimed in either of claims 16 and 17, characterized in that said superconducting device is immersed in a DC magnetic field oriented perpendicular to the surface plane of the slot.

19. Phase noise reduction device as claimed in any one of the preceding claims, characterized in that the superconducting circuit or circuits use a high critical temperature superconductor.